



**New Brunswick Laboratory**  
**U.S. Department of Energy**

**Certificate of Analysis**  
**CRM U630**

**Uranium Isotopic Standard**  
**10 mg Uranium as U<sub>3</sub>O<sub>8</sub>**

Isotopic Composition	<sup>234</sup> U/ <sup>235</sup> U	<sup>236</sup> U/ <sup>235</sup> U	<sup>238</sup> U/ <sup>235</sup> U
Isotopic Abundance Ratios	0.0097698 ± 0.0000062	0.0151895 ± 0.0000097	0.55351 ± 0.00049

Isotopic Abundance	<sup>234</sup> U	<sup>235</sup> U	<sup>236</sup> U	<sup>238</sup> U
Atom Fraction (× 100)	0.61894 ±0.00043	63.353 ± 0.020	0.96230 ±0.00067	35.066 ± 0.020
Mass Fraction (× 100)	0.61354 ±0.00043	63.069 ± 0.020	0.96207 ±0.00067	35.356 ± 0.020

**Relative Atomic Weight: 236.10175 ± 0.00061**

The expanded uncertainties (U) are expressed as 95% confidence intervals for the values. U is defined as  $k \cdot u_c$  where  $k$  is the coverage factor and  $u_c$  is the combined standard uncertainty. The last figure in the reported values and their uncertainties is provided to reduce errors in rounding numbers and is not intended to convey reliability at that level. The expanded uncertainty (U) for a certified property of CRM U630 defines a confidence interval around the value of the property. The coverage factor  $k$  is equal to 2 in all cases. The combined standard uncertainties for the certified values consist of Type A and Type B components; the major contributor to the uncertainties of all of the certified values is associated with the uncertainty of the CRM U500 and CRM U750 reference standards.

This Certified Reference Material (CRM) is primarily intended for the calibration of mass spectrometers used to perform uranium isotopic measurements. Each unit of CRM U630 consists of approximately 10 mg of uranium, in the form of highly purified U<sub>3</sub>O<sub>8</sub>, contained in a 20-mL glass bottle. The Naval Nuclear Fuel Division of BWX Technologies, Inc., provided the material. The uranium isotopic abundances of the material were determined at NBL by thermal ionization mass spectrometry. The <sup>238</sup>U/<sup>235</sup>U isotope ratio was measured in total evaporation mode using two different mass spectrometers. The measured isotopic ratios were corrected for mass discrimination using NBL CRM's U500 and U750. The <sup>234</sup>U/<sup>235</sup>U and <sup>236</sup>U/<sup>235</sup>U isotope ratios were measured on a single mass spectrometer using a multi-dynamic measurement procedure.

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